

The ENVVEST Approach for Stormwater Pollutant Loading in the Sinclair - Dyes Inlet Watershed

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Project ENVironmental InVEStment (ENVVEST) was initiated as a cooperative effort among the Puget Sound Naval Shipyard, regulatory agencies, and local stakeholders to create a contaminant mass balance for Sinclair-Dyes Inlet. The draft sediment mass balance identified stormwater loading as a significant data gap. This study estimates stormwater loading, incorporates this data into the mass balance, and investigates correlations between contaminant loading and natural forest land-cover, total impervious surface area (TIA), and various land-use categories within each watershed. Stormwater contaminant loading was determined as the storm event mean and/or discrete stormwater samples collected during events in 2003/2004. Stormwater samples were collected from 11 streams and nine stormwater outfalls. All samples were analyzed for conventional water quality parameters plus metal and organic contaminants. The relationships between watershed urbanization and measured contaminant loading were evaluated using a landscape scale analysis of the Sinclair-Dyes Inlet watershed. An empirical landscape-scale analysis of this urbanizing watershed was conducted using GIS techniques. Across the watershed, it was found that the loss of native forest cover and the expansion of impervious surfaces were the best predictors of water quality for most contaminants. The refinement of stormwater loading calculations significantly improves the mass balance and supports the development of multi-parameter TMDLs. The data also support urban development planning and provide the foundation for the evaluation of best stormwater management practices for the short-term and long-term impacts on estuary sediments located within varying land-use land cover categories.